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## NEW CLAUSILIIDÆ OF THE JAPANESE EMPIRE—XI.

BY HENRY A. PILSBRY.

The present paper<sup>1</sup> deals chiefly with species of the Ryukyu Islands and Formosa, and especially with an interesting series of very small *Clausilia* related to *Zaptyx*. This series now comprises some twenty-nine species, all but one of them discovered by Mr. Hirase and his assistants. No member of the Zaptychoid group has been recognized in China. All are insular; and being among the most specialized of all *Clausilia* in structure, they indicate a greater antiquity for the Ryukyuan fauna than zoogeographers have generally been disposed to admit.

## Section MEGALOPHÆDUSA Bttg.

*Clausilia martensi concrescens* n. subsp.

In this form the spaces between the palatal plicæ are filled up, making a straight lunella with slightly uneven edge. Cuticle greenish yellow. Length 35, diam. 8.5 to 9 mm.

Shishikui, Awa, Shikoku Island. Types No. 90,044, A. N. S. P., from No. 1,189 of Mr. Hirase's collection.

## Section LUCHUPHÆDUSA Pils.

To the nine species of this section already known two are now to be added.

*Clausilia inolyta* n. sp. Pl. XXXII, figs. 1-4.

Shell rather slender, gradually and regularly tapering from the penultimate whorl to the small apex; extremely thick and solid; grayish white, being denuded of cuticle throughout; *very coarsely sculptured with strong straight rounded ribs* nearly as wide as their intervals, about 24 or 25 in number on the last whorl, and not coarser on its back. Whorls about 11, moderately convex, the last smaller than the penultimate, its last half compressed. Aperture small, vertical, piriform; peristome

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<sup>1</sup> This is the eleventh paper treating exclusively of Japanese Clausiliidæ collected by Mr. Hirase. Seven of them appeared under the title "Additions to the Japanese Land Snail Fauna," the rest under various titles. A list of them is appended to this paper. In all 165 pages, and 31 plates containing 535 figures drawn by the author, have been published.

Isabella-tinted, thick, well expanded and slightly reflexed; the *parietal margin cut into one or several rounded tubercles*, the peristome elsewhere smooth. Superior lamella marginal, subvertical, thick at its end, thin within and continuous with the spiral lamella, which penetrates past the aperture to the left side. Inferior lamella thick but not in the least doubled, forming a prominent fold in the mouth, very strongly spiral within, becoming horizontal and very strong a half whorl inward, then abruptly diminishing, penetrating as far as the spiral lamella. Subcolumellar lamella emerging to the lip-edge, penetrating inward as far as the other lamellæ. Principal plica not long, latero-ventral. *No upper palatal plica*. Lower palatal plica long, oblique and arcuate, a very oblique, long lunella rising from it near the middle, and curved inwards somewhat at the upper end.

Length 26, diam. 6, length of aperture 6.2 mm.

The clausilium (Pl. XXXII, figs. 3, 4) is well curved, the columellar margin straight, strengthened by a rib which terminates in a straight finger-like apical process; palatal margin arcuate.

Ogimi, prov. Kunchan, Ryukyu (Okinawa). Types No. 89,890 A. N. S. P., from No. 1,347 of Mr. Hirase's collection.

This is more coarsely sculptured than any other known *Luchuphædusa*, and is further distinguished by the very long lunella, as in *C. tokunoshimana*, and the absence of an upper palatal plica, present in the other species. The clausilium has most resemblance to that of *C. mima*.

In quite mature individuals the sculpture is largely worn from the ventral face of the shell, as shown in the figure.

**Clausilia koniyaensis** n. sp. Pl. XXXII, figs. 5-8.

Shell fusiform, the penultimate whorl widest, pale straw-yellow, glossy, closely and evenly striate, the striæ usually a little more spaced on the back of the last whorl. Whorls  $9\frac{1}{2}$ , slightly convex, the last compressed laterally, convex below. Aperture small, piriform, the peristome white, reflexed and somewhat thickened, the parietal margin weakly, irregularly crenulated. Superior lamella marginal, continuous with the spiral lamella, which penetrates past the ventral to the left side. *Inferior lamella more or less distinctly double*, forming two contiguous columellar folds; as long inside as the spiral lamella. Subcolumellar lamella emerging to the lip-edge, but rather weak; as long inside as the other lamellæ. Principal plica lateral, about a half whorl long. Upper palatal plica rather short and very oblique. Lower palatal plica long, strong and arcuate, a rather long, oblique lunella rising from it in the middle.

Length 14.3–15.3, diam. 4 mm.

The clausilium (Pl. XXXII, figs. 6, 7) is much twisted, tapering and acuminate distally, with a notch between the thick terminal point and a smaller point on the palatal side, a short distance from the apex.

Koniya, Ōshima, Ōsumi, Types No. 94,543, A. N. S. P., from No. 654a of Mr. Hirase's Collection.

This snail is much like *C. mima* Pils., also of Ōshima, but it is slightly larger and more strongly rib-striate, the inferior lamella is usually distinctly double, the subcolumellar lamella is less dilated below the lower palatal plica, and finally the shape of the clausilium is very different, as may be seen by comparing the figures here given with figs. 17, 18 of Plate 22 of these *Proceedings* for 1901. *C. koniyaensis* also resembles *C. tokunoshimana*, but differs in the shape of the clausilium, the less coarse sculpture, more lateral lunella, etc.

#### ZAPTYCHOID PHYLUM.

Numerous new species and groups of this phylum were discussed in the preceding paper of this series, but the modifications of internal armature and clausilium seem to be interminable, and a number of peculiar additional forms must now be described. These require an amplification and various modifications of the key to sections previously given. The key given below is designed to show the natural relationships of the groups so far as they are now understood.

#### KEY TO THE SECTIONS OF ZAPTYCHOID CLAUSILÆ.

- I.—Lunella normally developed, lateral, oblique, above united with or contiguous to the upper palatal plica, which varies from very long to short or even wanting, but when present this plica projects inward beyond the upper end of the lunella. Clausilium entire and rounded distally, or rarely mucronate.
  - a.—Inferior lamella receding, inconspicuous or invisible from in front, obliquely ascending and straightened within the back of the last whorl. Remote from the superior lamella.
  - b.—Shell without sutural plicæ, fulcrum or parallel lamella.
    - c.—Clausilium parallel-sided, flattened, rounded at the end.
 

Section HEMIZAPTYX.
    - c'.—Clausilium swollen and callous outside near the palatal margin, either angular or rounded at the end.
 

Section HETEROZAPTYX.
  - b'.—Shell thin; sutural plicæ, fulcrum and parallel lamella developed. Distal end of the clausilium rounded.
 

Section ZAPTYX.

- a*<sup>1</sup>.—Inferior lamella ascending in a broad spiral curve within the last whorl, approaching the superior lamella.
- b*.—Clausilium strongly tapering to the angular or narrowly rounded apex, not buttressed externally; fulcrum present; sutural plicæ weak or wanting, Section STEREOZAPTYX.
- b*<sup>1</sup>.—Clausilium tapering to the bluntly angular apex, buttressed outside by an erect transverse plate; no sutural plicæ or fulcrum; inferior lamella receding,  
Section PARAZAPTYX.
- b*<sup>2</sup>.—Clausilium wide distally, the apex rounded; smooth outside. Shell thin, sutural plicæ developed; inferior lamella approaching the superior in the aperture as a thin fold.  
Section METAZAPTYX.
- II.—The lunella arises from the middle of a long, arched lower palatal plica, and curves inward at its upper end; superior lamella developed or wanting; inferior lamella spirally ascending within; sutural plicæ, fulcrum and parallel lamella developed. Clausilium short, deeply notched on the palatal side near the apex, . . . . . Section OLIGOZAPTYX.
- III.—The upper palatal plica is very long, an extremely short lunella branching from near its inner end; inferior lamella spirally ascending within; superior lamella and sutural plicæ developed. Clausilium notched on the palatal side near the apex,  
Section DICERATOPTYX.
- IV.—The lunella is merely a continuation obliquely downwards of the inner end of the upper palatal plica, and its position is ventral in known species; no sutural or lower palatal plicæ or fulcrum; inferior lamella receding, vertical below, then bent to the left within the back of the last whorl. Palatal margin of the clausilium more or less excised below the middle.
- a*.—Peristome entire, the aperture normally clausiloid; upper palatal plica and lunella together much shorter than the principal plica, . . . . . Section SELENOPTYX.
- a*<sup>1</sup>. Peristome widely interrupted; shell imperforate, not in the least rimate; the upper palatal plica with the lunella forms a very long, slightly bowed fold, subparallel to the principal plica, but diverging downward towards the inner end,  
Section THAUMATOPTYX.

## Section HETEROZAPTYX Pils.

Proc. A. N. S. Phila., 1905, p. 739, footnote.

Shell like *Hemizaptyx*; the upper palatal plica either short (as in *Zaptyx*) or very long, approaching the aperture, and sometimes it is interrupted. The clausilium is deeply excised on the columellar side at the filament, *callous and swollen outside near the palatal margin*, and either acuminate or rounded at the end. Type *C. munus* (*Heterozaptyx*, unlike *Zaptyx*).

The two species of this group hitherto known were referred to *Hemizaptyx* as a second division (*Proc. A. N. S. Phila.*, 1904, p. 825); but the discovery of more species with the same type of clausilium makes it expedient to recognize the group by name. It is closely related to *Hemizaptyx* in shell features, but differs in the peculiar swell and callus along the outside of the clausilium near its palatal border.

The species now known are as follows:

- I.—Clausilium rather long, acuminate at the apex, which is a little hooked backward.
  - a.—Upper palatal plica interrupted, a short portion being situated at the top of the lunella and a long one in the back of the last whorl, visible in the mouth. Formosa, *C. diacoptyx*.
  - a<sup>1</sup>.—Upper palatal plica very long, extending nearly to the lip. Clausilium unknown. Formosa, . . . *C. uraniscoptyx*.
  - a<sup>2</sup>.—Upper palatal plica short; shell striate.
    - b.—Shell dark reddish-brown, glossy, and rather thin, 10 to 11 mm. long, 2 to 2.3 wide, with 7½ whorls; sides of the clausilium strongly reflexed. Tokunoshima, *C. hyperaptyx*.
    - b<sup>1</sup>.—Shell pale chestnut or brownish corneous, rather thin, 11 to 13 mm. long, 2.7 wide, with 9 to 10½ whorls; clausilium distinctly hooked at the apex. Oshima, *C. oxypomatica*.
    - b<sup>2</sup>.—Shell brown or yellowish-brown, quite solid when adult, 12 to 15 mm. long, 3 to 3.6 wide, with 9 to 10 whorls. Clausilium distinctly hooked at the apex. Oshima, *C. munus*.
- II.—Clausilium short, very wide distally, where it is broadly rounded and recurved at the edge. Upper palatal plica very long, approaching the aperture. Kerama-jima, Ryukyu, *C. longiplicata*.

**Clausilia hyperaptyx** Pils.

*Proc. A. N. S. Phila.*, 1904, p. 827.

The clausilium (Pl. XXXII, fig. 10), seen from the palatal side, is here figured, to show the unusual width of the reflexed palatal margin. The terminal hook is much less developed than in *C. oxypomatica* (*hyperaptyx*, with no fold above).

**Clausilia munus** Pils.

*Proc. A. N. S. Phila.*, 1901, p. 423.

The clausilium is here figured (Pl. XXXII, figs. 11, 12) from the type specimen. It is conspicuously angular at the apex, which is decidedly thickened, and in profile view is seen to be hooked backward. The columellar margin is regularly arcuate, bordered by a thickened rim. The palatal margin is rather strongly convex in the middle, and above the middle it is very much thickened outside, as

shown in the profile view. In some specimens it has a concavity in the inner face corresponding to the external callus. The main curvature of the clausilium is not far from the origin of the filament; elsewhere it is nearly straight in profile view.

In specimens from Ikejijima, Ōshima, the external callosity referred to is weak. In those from Koniya, Ōshima, the clausilium is typical. The shells from this place are more delicate, thinner than the types of *C. munus* (*munus*, a gift).

**Clausilia diacoptyx** n. sp. Pl. XXXIII, figs. 13-19.

Shell fusiform, the apex rather obtuse, whorls 8 to 9, moderately convex, the last tapering downwards. Surface glossy, smooth, faintly striatulate, the last whorl rib-striate for a short distance behind the outer lip. Pale greenish corneous, somewhat transparent. Aperture ovate, the lip well reflexed and thick. Superior lamella marginal, continuous with the spiral lamella, which is high in the lateral region, and extends inward to a point above the superior lamella. Inferior lamella deeply receding, straightened and obliquely ascending within, shorter than the spiral lamella, or equal to it. Subcolumellar lamella strongly emerging to the lip-edge, a groove with raised margins on each side of it. Principal plica somewhat more than a half whorl long, dorsal and lateral, approaching the lip. Upper palatal plica consisting of two portions, the inner portion short, across the top of the straight, lateral lunella, the other portion widely separated from it, dorsal, visible in the mouth, long, and diverging forward a little from the principal plica.

Length 10, diam. 2.3 mm.

“ 8.8 “ 2.3 “

“ — “ 2.7 “

The clausilium (Pl. XXXIII, figs. 15, 16, 17) is rather long with subparallel margins, the columellar margin abruptly excised above, then straight, and near the apex strongly curved towards the palatal margin. The apex is curved toward the palatal margin and then outward in an acute point, separated from the palatal side by a rather deep excision, which is scarcely apparent in a front view, but is conspicuous in a profile view from the palatal side. The palatal margin is thick and slightly arched.

Sammaipo, Taiwan (Formosa). Types No. 89,896, A. N. S. P., from No. 1,430 of Mr. Hirase's collection.

This species is probably related to *C. uraniscoptyx* Schm. and Bttg., from Bankimsong, Formosa, but unfortunately the clausilium of that species has not been described. The present form differs from

that described by Schmacker and Boettger by its broadly interrupted upper palatal plica and the non-ascending last whorl.

***Clausilia oxypomatica*** n. sp. Pl. XXXIII, figs. 20-24.

Shell cylindric-fusiform, attenuated towards the rather acute apex, pale chestnut or brownish corneous, slightly transparent, the old shells opaque, very finely but not deeply striate, more coarsely so on the last half whorl. Whorls 9 to  $10\frac{1}{2}$ , but slightly convex, the last compressed laterally, the base tapering. Aperture rhombic-ovate. Peristome expanded and reflexed, rather narrow and not much thickened except in old shells; parietal wall free, emarginate above the superior lamella. The superior lamella is vertical, marginal, thin but rather high, continuous with the spiral lamella, which is very high in the lateral position, and penetrates to a point above the superior lamella. The inferior lamella recedes deeply, is straight and oblique within the last whorl, and penetrates inward less deeply than the spiral lamella. The subcolumellar lamella emerges. Principal plica more than a half whorl long, dorsal and lateral, approaching the aperture. Upper palatal plica thin but moderately long, with the lunella forming a T-shaped barrier.

Length 13, diam. 2.7 mm.

“ 11, “ 2.7 “

The clausilium (Pl. XXXIII, figs. 21, 22, 23) is not much curved, but is quite concave internally and convex or somewhat baggy externally. The columellar side is very deeply excised at the filament. The two sides are about equally arcuate, the apex somewhat acuminate and projecting, as though a drop were hanging there. There is a rib inside along the columellar margin, and a more diffuse callus on the outside along the palatal margin.

Ōshima, Ōsumi. Types No. 89,889, A. N. S. P., from No. 1,336 of Mr. Hirase's collection.

This species falls into the second division (II) of my key to *Hemi-zaptyx* (*Proc. A. N. S. Phila.*, 1904, p. 825). It differs from both the species of that division (*C. hyperaptyx* and *C. munus*) in having the upper palatal plica somewhat longer, the lunella joining it in the middle. It is thinner and more slender than *C. munus*, larger, wider, paler and less sharply striate than *C. hyperaptyx* (*oxypomaticus*, having a sharp lid or "clausilium").

At Koniya, Ōshima, there is a variety of *C. munus* more delicate than the type lot, the shell usually somewhat smaller and more slender. It is this form which approaches *C. oxypomatica*.



**Clausilia longiplicata** n. sp. Pl. XXXIII, figs. 25-29.

Shell cylindric-fusiform, strong, light yellowish brown, subtransparent except when old, when it becomes opaque. *Surface very smooth and glossy*, as if varnished, marked with faint growth-lines only. Whorls  $8\frac{1}{2}$ , moderately convex, the last a little compressed laterally, pinched into a short low and rounded basal crest. Aperture rhombic-ovate, the white peristome a little expanded and narrowly reflexed, thickened in old shells. *Superior lamella high and compressed*, continuous with the spiral lamella which is also exceptionally high, and continues inward to a point above the sinulus. Inferior lamella receding, low but strong and callous within, at first vertically ascending, then abruptly bent to the left, after which it ascends vertically again, abruptly becoming low on the ventral side, and much shorter there than the spiral lamella. Subcolumellar lamella very slender, emerging to the lip-edge, bounded by grooves. Principal plica dorsal and lateral, extending nearly to the lip. *Upper palatal plica very long*, parallel to the principal plica on the side, but diverging from it on the back, where it approaches the lip, and is seen conspicuously in the mouth. Lunella lateral, *very oblique*, slightly arcuate, tapering towards the ends, not reaching the upper palatal plica, or but weakly joining it. There is no lower palatal plica. Sutural plicæ and fulcrum are absent.

Length 11, diam. 2.9 mm.

" 10, " 2.3 "

" 10, " 2.6 "

The clausilium (Pl. XXXIII, figs. 25, 26) is very short, spatulate, being broad and rounded distally. It is excised near the filament as usual in Zapytychoid clausiliæ; near the distal end it bulges inward, and has a corresponding concavity on the outer face. It is somewhat calloused along the palatal margin.

Kerama-jima, Ryukyu. Types No. 89,892, A. N. S. P., from No. 1,361 of Mr. Hirase's collection.

This peculiar snail resembles *C. agna* in its general form and brilliant gloss, but differs widely in internal structure. The long upper palatal plica reminds one of *C. dolichoptyx*, but that species is in everything else a true *Zapytyx*. The long upper palatal plica and short lunella suggest *Diceratoptyx*, which, however, differs by the shape of the inferior lamella, the different clausilium, etc. *C. uraniscoptyx* of Formosa differs from *longiplicata* by its ascending last whorl (*longiplicatus*, long-folded, in allusion to the long upper palatal plica).

## Section ZAPTYX Pils.

The following species enlarges our conceptions of *Zaptyx* by a structure not before known in the section; the upper palatal plica being greatly lengthened, as in *Heterozaptyx*, while in the other known species of *Zaptyx* it is comparatively short.

**Clausilia doliohoptyx** n. sp. Pl. XXXIV, 30-33.

Shell slender, fusiform-turrit, chestnut-brown, rather opaque, shining; the spire long, tapering and somewhat attenuate, apex obtuse, whitish. Whorls  $9\frac{1}{2}$  to 10, convex, very slowly increasing, irregularly striatulate or marked with growth-wrinkles. Aperture narrowly piriform, small; the peristome white, continuous, narrowly expanded, the outer lip a little reflexed. *The superior lamella is very small or subobsolete; the spiral lamella is reduced to a very small, short lamella in the region of the lunella.* The inferior lamella recedes deeply, being hardly visible in the aperture; in the back it ascends obliquely, is low, rather thick and straightened, not continuous with a short portion which lies parallel to the short spiral lamella. There is a fulcrum and a parallel lamella. The subcolumellar lamella is usually quite immersed, but sometimes emerges. The principal plica is short, about a fourth of a whorl long, and in a lateral position. *The upper palatal plica is very long*, the lunella joined to it near its inner end; thence it diverges from the principal plica, running towards the aperture. The lunella is long and nearly straight. Two short sutural plicæ stand above the lunella.

Length 12.5 diam. 3, length of aperture 2.5 mm.

" 10.5 " 2.5, " " " 2 "

Clausilium (Pl. XXXIV, figs. 31, 32) with the curvature chiefly near the filament, as usual in *Zaptyx*; very wide above, tapering distally, rounded at the apex. It is deeply excised on the columellar side of the filament, and much dilated on the palatal side.

Heda, Kunchan, Ryukyu. Types No. 90,020, A. N. S. P., from No. 1,342 of Mr. Hirase's collection.

This species is readily recognized by the very long upper palatal plica, the small superior lamella very widely separated from the short spiral lamella, and the number of whorls, which is greater than in the other species. With the exception of the upper palatal plica, the structure is not unlike that of *C. hirasei*, the type of *Zaptyx* (*doliohoptyx*, long fold).

**Clausilia doliohoptyx micra** n. subsp.

Shell smaller than *C. doliohoptyx*, nearly smooth except the last half

whorl, which is sharply and finely striate, whorls 8 to  $8\frac{1}{2}$ . Superior lamella well developed; subcolumellar lamella emerging.

Length 9.5, diam. 2.3 mm.

" 8.5 " 2 "

Heda, Kunchan. Types No. 90,021, A. N. S. P., from No. 1,343 of Mr. Hirase's collection.

**Clausilia hyperoptyx** Pils.

Specimens from Heanza-jima, Kunchan, are smaller than the types, 8 to 9 mm. long. They have the upper palatal plica rather long.

A series from Sezoko-jima, Kunchan, consists in part of typical *hyperoptyx*, in part of densely striate specimens which would be referable to *yaeyamensis*, from which they differ only in the slightly finer striation.

The study of these specimens causes me to reduce *C. yaeyamensis* to a variety of *C. hyperoptyx*. It differs only in the striation, and in showing the inferior lamella somewhat more conspicuously as a thin fold, in an oblique view in the mouth. In *hyperoptyx* this lamella recedes more. The superior and spiral lamellæ are weakly continuous (*hyperoptyx*, fold above).

Section STEREOZAPTYX Pilsbry.

Shell Zptychoid, with the inferior lamella strongly spiral within, thick at its base, which recedes more or less; spiral lamella weak and low; lunella well developed; a nodular fulcrum present; sutural plicæ weak or absent. Clausilium well curved, wide above, strongly tapering to the angular or narrowly rounded apex, abruptly excised on the columellar side at the origin of the filament.

This section differs from *Parazptyx* and *Metazptyx* in the calloused columellar or inferior lamella, which in both of the others is thin and high. It further differs from *Parazptyx* in lacking a transverse rib on the clausilium, and from *Metazptyx* by the strongly tapering distal end of the clausilium; that of *Metazptyx* being wide distally. In the species now known the superior and spiral lamellæ are not continuous.

**Clausilia entospira** Pils. Pl. XXXII, fig. 9.

Proc. Acad. Nat. Sci. Phila., 1901, p. 645.

A figure is here given to show the internal structure, and especially the fulcrum (*f.*), which was overlooked when I first described the species. It has been found only on Tanega-shima. Additional specimens received agree with the types. It is a rare snail (*entospira*, spiral within).

*Clausilia exulans* n. sp. Pl. XXXIV, figs. 40, 41, 42.

Shell fusiform, the spire attenuated above, rather thin, glossy, yellowish or brownish corneous, somewhat transparent except when old. Whorls 9 to  $9\frac{1}{2}$ , the earlier, attenuated ones quite convex, the larger later ones less so, the last whorl tapering, laterally flattened, shortly free in front. Surface weakly striatulate, the last whorl becoming strongly evenly striate on the back, rounded below. Aperture small, piriform-ovate, the peristome expanded and reflexed, rather thin. Superior lamella small, short and thin, broadly separated from the small, low and short spiral lamella. Inferior lamella deeply receding, appearing as a doubly nodular fold in an oblique view in the mouth. Inside it is strongly spiral, low, thin, with a callous nodule below; above it becomes strong and high; not continued parallel to the spiral lamella, and therefore not nearly so deeply penetrating. The subcolumellar lamella emerges. There is a nodule-like fulcrum. Principal plica about a half whorl long, extending from the middle of the dorsal to the middle of the ventral side. Upper palatal plica small and short. Lunella very strong and high, *subventral*, slightly arcuate. There is a small sutural plica.

Length 11.7, diam. 2.25, length of aperture 2.25 mm.

“ 10, “ 2 mm.

“ 11, “ 2.3 “

Clausilium (Pl. XXXIV, figs. 40, 41) strongly arcuate, deeply and abruptly excised on the columellar side of the filament; wide above, strongly tapering to the apex, which though narrow is rounded. The palatal side is dilated near the filament. The filament is deeply inserted in the middle of the penultimate whorl.

Nase, Ōshima, Ōsumi. Types No. 89,888, A. N. S. P., from No. 1,335 of Mr. Hirase's collection.

This form is closely related to *C. entospira* of Tanega-shima. It is a more lengthened, slenderer shell than that, with more whorls; it is much thinner, and there is a weak upper palatal plica, not present in the other; finally, the aperture projects farther forward.

#### Section OLIGOZAPTYX Pilsbry.

*Clausilia hedleyi hyperodonta* n. subsp.

Similar to *C. hedleyi*, but it differs in having a superior lamella distinctly developed. Varying in size from

Length 9.5, diam. 2 mm., to

“ 7.5, “ 1.7 “

Koniya, Ōshima. Types No. 90,019, A. N. S. P., from No. 1,202a of Mr. Hirase's collection.

## Section SELENOPTYX nov.

Shell with the oblique ventral lunella and the upper palatal plica united into a continuous crescentic barrier, the convex side of the crescent inward and upward; otherwise like *Hemizaptyx*. Clausilium excised on the columellar side at the filament. Palatal border reflexed, the lower half more or less excised. Type *C. noviluna*.

This group is unlike any other in palatal armature, the inner end of the upper palatal plica passing directly into the oblique lunella, forming a crescent which may be somewhat angular in the middle. This is ventrally or latero-ventrally situated, and except in old, opaque shells is visible through the front of the shell. The inferior lamella is remote from the superior, not visible in a front view, vertical within, with a bend to the left in the middle. The clausilium is peculiar.

*Clausilia noviluna* n. sp. Pl. XXXIV, figs. 34-39.

Shell fusiform, attenuate above. Whorls about  $10\frac{1}{2}$ , the upper ones convex, the last flattened laterally. Surface glossy, brown, *densely and very finely striate throughout*, the striation not coarser on the last whorl. Aperture rhombic-ovate, the peristome expanded, thick. The superior lamella is slightly oblique, thin and rather high, marginal, continuous with the spiral lamella which is very low within the back, but high ventrally, penetrating past the aperture. The inferior lamella recedes deeply, is flattened and ascends vertically within the back, then bends abruptly to the left, and finally ascends again. It is not continued parallel to the spiral lamella. The subcolumellar lamella emerges. It is weak throughout. The principal plica is more than a half whorl long, dorsal and lateral extending nearly to the aperture. The upper palatal plica is of moderate length, inwardly continuous with the obliquely descending lunella, which is latero-ventral in position. There are no accessory lamellæ or plicæ.

Length 10.7, diam. 2.8 mm.

“ 8.5 “ 2.3 “

The clausilium (Pl. XXXIV, figs. 34, 35, 36) is abruptly excised on the columellar side of the filament. In the middle of the palatal margin there is a backwardly projecting point or angle of the recurved margin, below which the edge is notched and irregular.

Iheya-jima, Ryukyu. Types No. 90,046, A. N. S. P., from No. 1,356 of Mr. Hirase's collection.

This curious little snail is related to the following species, having the same kind of palatal plica and lunella, completely united into a single curved barrier (*noviluna*, new moon, in allusion to the narrow, curved lunella).

*Clausilia inversiluna* n. sp. Pl. XXXIV, figs. 43, 44.

Shell fusiform, the lower half rather obese, the spire rapidly tapering, and strongly attenuated above. Whorls 9 to  $10\frac{1}{2}$ , the upper ones quite convex, the lower less so, last whorl tapering, laterally flattened. Surface brown, shining, striatulate, the last whorl very finely and densely striate. Aperture rhombic-ovate, the peristome reflexed, thick, pale brownish. Superior lamella marginal, subvertical, becoming very low inside, where it is weakly continuous with the spiral lamella, which becomes high within the ventral side, and penetrates past the sinulus to the middle of the left side. The inferior lamella recedes deeply. Within the back it is thick and ascends vertically, then bends inward, but is not continued on the penultimate whorl parallel to the spiral lamella. The subcolumellar lamella emerges. The principal plica is three-fourths of a whorl long, extending from near the lip to a point above the sinulus. The upper palatal plica is of moderate length, and inwardly is continuous with the slightly shorter lunella, which is exactly ventral in position and descends obliquely inward, to the peristome just above the superior lamella.

Length 11.8, diam. 2.8 mm.

" 10, " 2.8 "

" 10, " 2.6 "

The clausilium (Pl. XXXIV, fig. 44) is rather wide above, excised at the origin of the filament, on the columellar side; it tapers distally to a narrow, rounded apex, near which it is concave on the palatal side. Both sides are rolled back.

Kumejima, Ryukyu. Types No. 90,045, A. N. S. P., from No. 1,359 of Mr. Hirase's collection.

This is closely related to the preceding species (*C. noviluna*), but it differs in being larger, less strongly striate, with the inferior lamella bent less abruptly within the back; the lunella is situated more deeply, and the clausilium is much less specialized, wanting the angular lobe and notch on the palatal margin, so conspicuous in *C. noviluna*. The peristome reminds one of the Formosan *C. sheridani* (*inversiluna*, moon inverted).

#### Section THAUMATOPTYX nov.

Clausiliæ with discontinuous peristome, the columellar and parietal walls covered with an adnate callus, the aperture therefore somewhat Bulimoid. Inferior lamella receding, vertical below, abruptly bent inward in the middle. *Upper palatal plica and lunella indistinguishably united into one extremely long, arcuate fold*, subparallel to the

principal plica, but curving down at the inner end. *Clausilium Zaptychoid*, with an angular projection near the middle of the palatal margin. Type *C. bivineta*. (*Thaumatoptyx*, wonderful fold.)

This group is proposed for a marvellously specialized *Clausilia*. The shell is not in the least rimate, the columellar and parietal margins of the peristome being wholly adnate to the whorl, represented by a thin-edged callus spread upon the whorl. It has some resemblance to *Selenoptyx* in the deeply receding closing apparatus, the abruptly bent inferior lamella within the last whorl, the shape of the combined upper palatal plica and lunella, and in the form of the clausilium.

*Clausilia bivineta* n. sp. Pl. XXXIV, figs. 45, 46.

Shell slenderly fusiform, slowly tapering above to the rather large, obtuse apex; thin, yellowish-corneous, subtransparent. Surface glossy, faintly striatulate, the last whorl slightly striate behind the lip. Whorls 8 to 9, the upper ones quite convex, the penultimate whorl largest, the last whorl tapering, *constricted around the middle* as though bound in by two tightly encircling cords. Aperture irregularly piri-form, the outer and basal lips expanded, narrowly reflexed, not thickened within; outer lip sinuous, being arched forward above the middle, retracted at sinulus and base. *The columellar and parietal lips are reflexed and wholly adnate*, appearing only as a whitish callus spreading upon the last whorl. The superior lamella is very small, thin and oblique, not attaining the margin, continuous with the spiral lamella, which is low within the back, but becomes high on the ventral side. It penetrates past the aperture to the middle of the left side. The inferior lamella recedes so as to be invisible from in front; within the back it ascends vertically a short distance, then turns abruptly and horizontally to the left, and then again ascends in a very wide plate to its insertion. It does not penetrate parallel to the spiral lamella. The subcolumellar lamella emerges. The principal plica is one whorl long, running from near the lip to the middle of the left side. The upper palatal plica is as long as the principal plica and subparallel to it, but it diverges somewhat forwardly, where it is visible in the mouth, and its inner end (apparently representing the lunella) diverges still more, running obliquely down to the suture, behind the posterior angle of the aperture. The principal plica and the upper palatal plica are visible through the shell, and appear like cords causing the constriction of the last whorl. There are no other palatal plicæ, but the subcolumellar lamella runs up on the palatal wall in the position of a lower palatal plica.

Length 9, diam. 1.8 mm.

" 7.3, " 1.8 "

The clausilium is rather wide and somewhat resembles that of *Clausilia noviluna*. It is excised at the filament on the columellar side, and there is a projection or point near the middle of the palatal margin. It lodges ventrally (*bivinctus*, twice bound).

Hotawa, Taiwan (Formosa). Types No. 89,894, A. N. S. P., from No. 1,405 of Mr. Hirase's collection.

This minute *Clausilia* is highly specialized, and is without near relatives among known forms. It is a rare species, of which only five were found. The last whorl has the appearance of being bound with two cords about the middle.

LIST OF PAPERS DESCRIBING JAPANESE CLAUSILIIDÆ COLLECTED BY  
MR. Y. HIRASE, 1900-1907.

1. Additions to the Japanese Land Snail Fauna—II. *Proc. A. N. S. Phila.*, 1900, pp. 443-448, Pl. XIV.
2. Additions to the Japanese Land Snail Fauna—III. *Proc. A. S. Phila.*, 1900, pp. 672-683, Pls. XXIV, XXV (1901).
3. Additions to the Japanese Land Snail Fauna—IV. *Proc. A. N. S. Phila.*, 1901, pp. 465-485, Pls. XXV-XXVIII.
4. Additions to the Japanese Land Snail Fauna—V. *Proc. A. N. S. Phila.*, 1901, pp. 622-646, Pls. XXXV-XXXIX (1902).
5. The Land Mollusks of the Loo Choo Islands: Clausiliidæ. *Proc. A. N. S. Phila.*, 1901, pp. 409-424, Pls. XXII, XXIII.
6. Catalogue of the Clausiliidæ of the Japanese Empire. *Proc. A. N. S. Phila.*, 1901, pp. 647-656 (1902).
7. Additions to the Japanese Land Snail Fauna—VI. *Proc. A. N. S. Phila.*, 1902, pp. 360-382, Pls. XVII-XXI.
8. Additions to the Japanese Land Snail Fauna—VII. *Proc. A. N. S. Phila.*, 1902, pp. 517-533, Pls. XXVII, XXVIII.
9. Additions to the Japanese Land Snail Fauna—VIII. *Proc. A. N. S. Phila.*, 1903, pp. 315-319, Pl. XIV.
10. New Clausiliidæ of the Japanese Empire—X. *Proc. A. N. S. Phila.*, 1904, pp. 809-838, Pls. LII-LVII (1905).
11. New Clausiliidæ of the Japanese Empire—XI. *Proc. A. N. S. Phila.*, 1907, pp. 479-513, Pl. XXXII-XXXIV (1908).

EXPLANATION OF PLATES XXXII, XXXIII, XXXIV.

PLATE XXXII.—Figs. 1-4.—*Clausilia inclyta* n. sp.

Figs. 5-8.—*Clausilia koniyaensis* n. sp.

Fig. 9.—*Clausilia entospira* Pils., broken to show interior of last whorl; f, fulcrum. A. N. S., No. 84,898.

Fig. 10.—*Clausilia hyperptyx* Pils. Palatal view of the clausilium.

Figs. 11, 12.—*Clausilia munus* Pils. Clausilium of the type.

PLATE XXXIII.—Figs. 13-19.—*Clausilia diacoptyx* n. sp.

Figs. 20-24.—*Clausilia oxypomatica* n. sp.

Figs. 25-29.—*Clausilia longiplicata* n. sp.

PLATE XXXIV.—Figs. 30-33.—*Clausilia dolichoptyx* n. sp.

Figs. 34-37.—*Clausilia noviluna* n. sp.

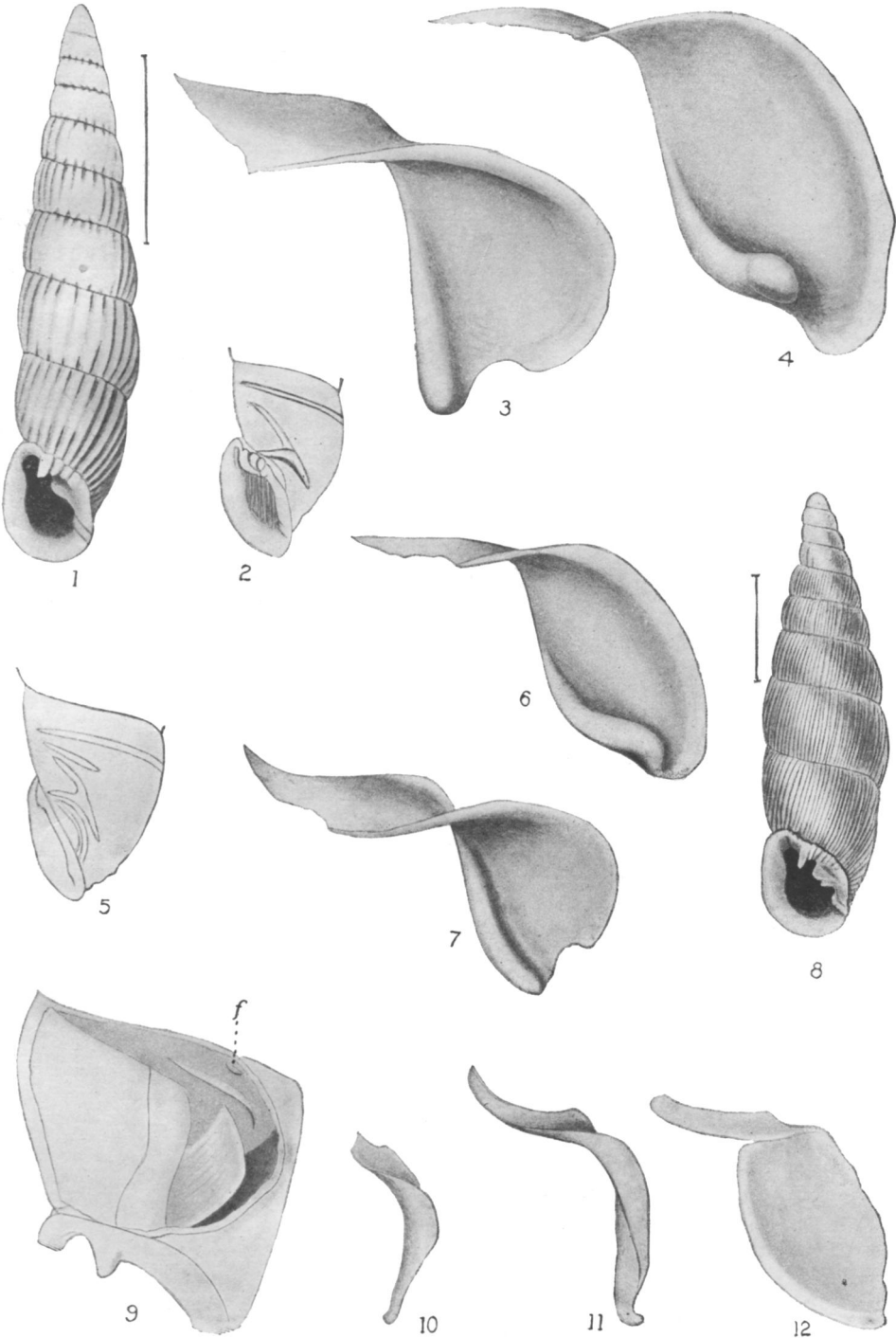
Figs. 38, 39.—*Clausilia noviluna*, small form.

Figs. 40-42.—*Clausilia exulans* n. sp.

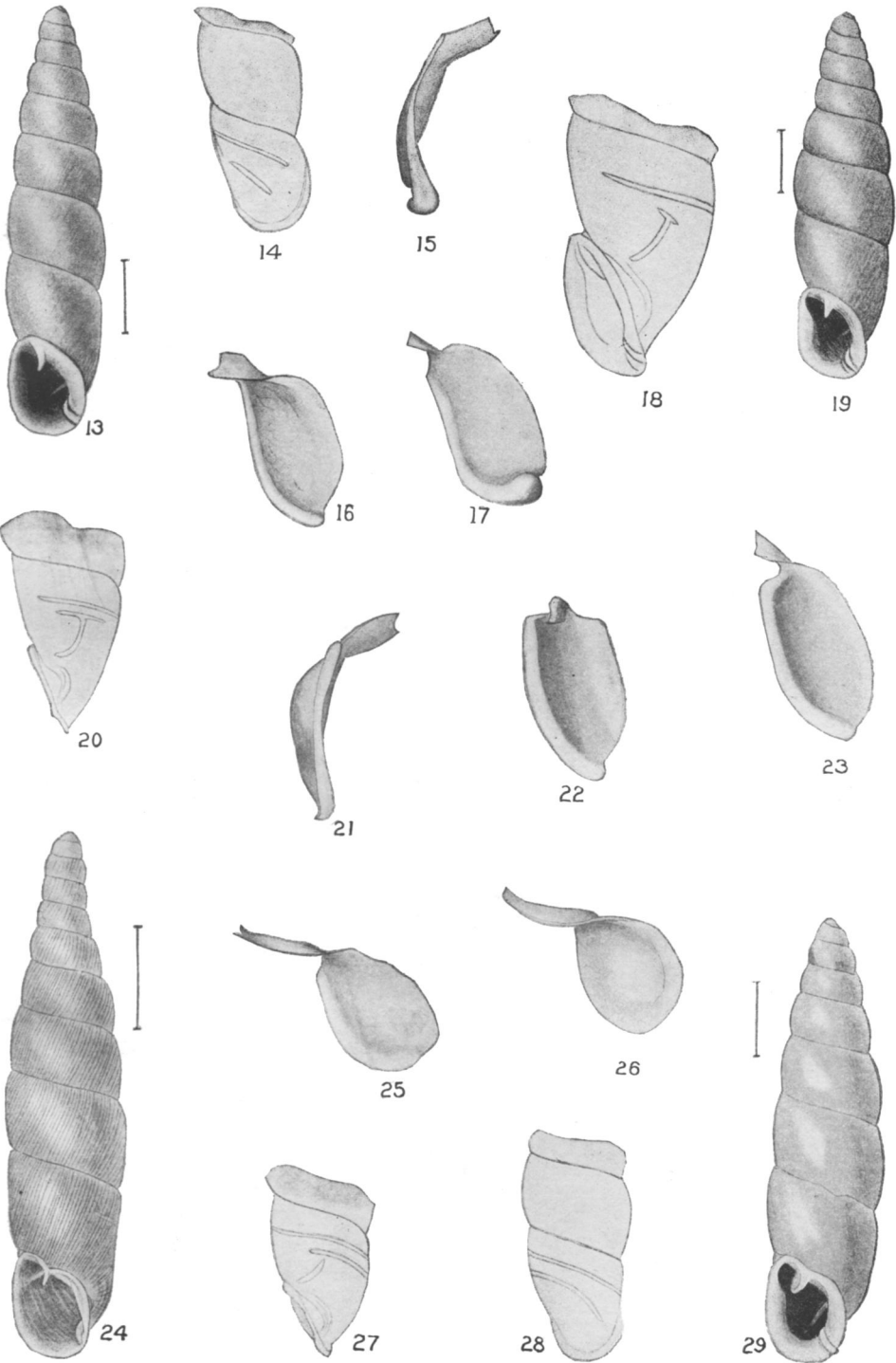
Figs. 43, 44.—*Clausilia inversiluna* n. sp.

Figs. 45, 46.—*Clausilia bivincta* n. sp.

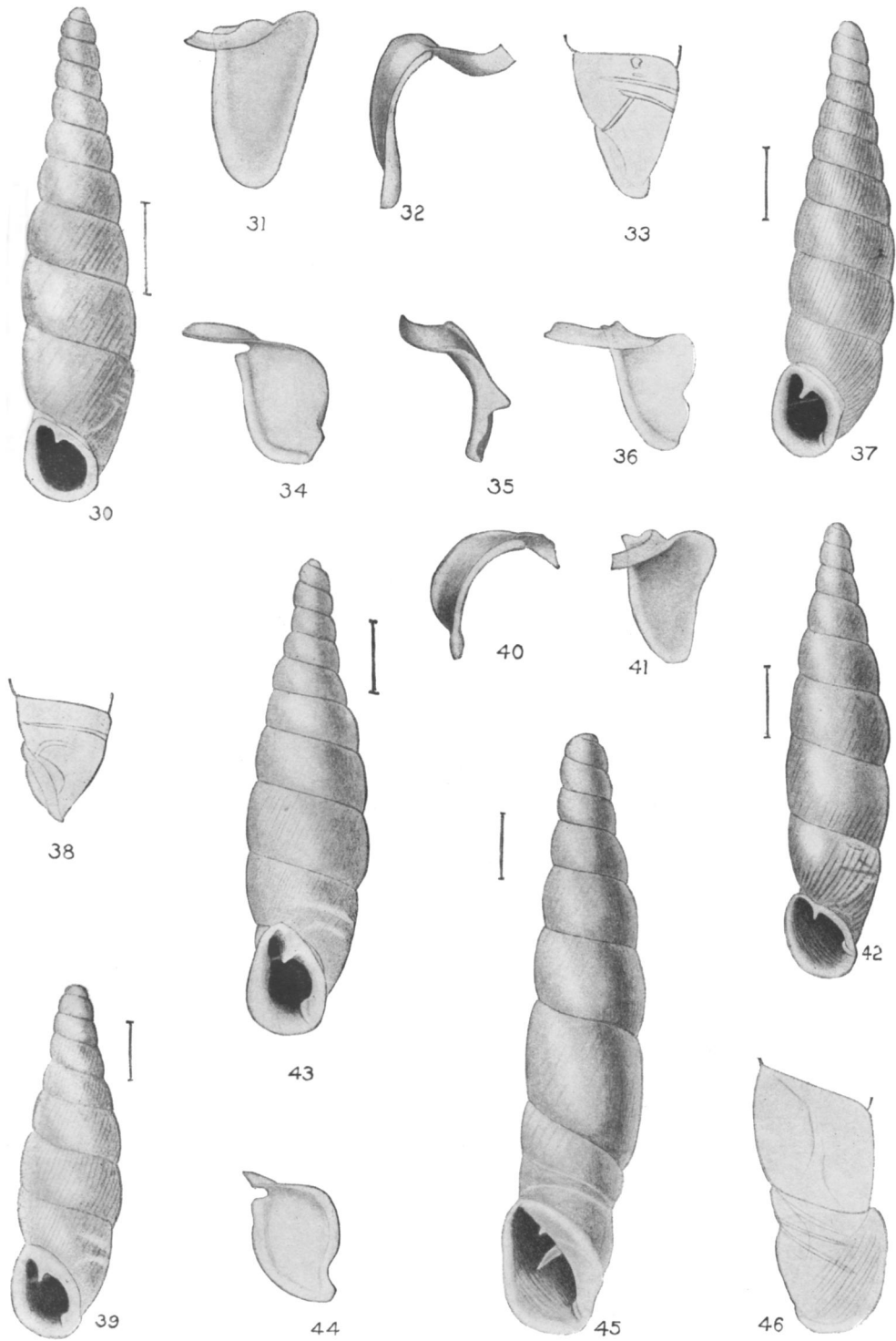




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